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CLAIMS

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1. A tunable optical element comprising:

a moveable path changing optical element adapted to receive light in a first optical beam on a first path and provide the light in a second optical beam on a second path, the second path being dependent on the position of the moveable path changing optical element; and

a position dependent optical element receiving the light in the second optical beam, the position dependent optical element changing a spectral characteristic of the light depending on the position of receipt of the light in the second optical beam by the position dependent optical element.

- 2. The tunable optical element of claim 1 wherein the moveable path changing optical element is a mirror.
- 3. The tunable optical element of claim 2 wherein the mirror is rotatable about an axis.
- 4. The tunable optical element of claim 3 wherein the mirror is a MEMS mirror.

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5. The tunable optical element of claim 4 wherein the position dependent optical element is a Fabry-Perot filter formed of reflective front and rear surfaces, with the distance between the front and rear surfaces varying with location.

- 6. The tunable optical element of claim 5 wherein the Fabry-Perot filter is wedge shaped.
- 7. The tunable optical element of claim 5 wherein 35 the Fabry-Perot filter is a wedge shaped etalon.

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- 8. The tunable optical element of claim 5 wherein the Fabry-Perot filter is formed of a number of discrete steps of varying cavity length.
 - 9. The tunable optical element of claim 5 further comprising a detector receiving light spectrally changed by the position dependent optical element.
 - 10. The tunable optical element of claim 9 further comprising optics collimating the light in the second optical beam.
 - 11. The tunable optical element of claim 10 further comprising a controller commanding adjustments in the position of the mirror.
 - 12. The tunable optical element of claim 1 wherein the position dependent optical element is an interferometer having different resonant wavelengths along the length of the interferometer.
- 25 13. The tunable optical element of claim 12 further comprising a fiber providing light in the first optical beam and receiving light with a spectral characteristic changed by the interferometer.
- 30 14. The tunable optical element of claim 13 further comprising an optical circulator providing light to the fiber and receiving light from the fiber.
- 15. The tunable optical element of claim 1 wherein 35 the position dependent optical element has different

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reflectivities for different polarizations, the reflectivity varying spatially across the position dependent optical element.

- 16. The tunable optical element of claim 15 further comprising a fiber providing light in the first optical beam and receiving light with a spectral characteristic changed by the interferometer.
- 17. The tunable optical element of claim 16 further comprising an optical circulator providing light to the fiber and receiving light from the fiber.
- 18. The tunable optical element of claim 1 wherein the position dependent optical element is an array of waveguides, with different waveguides having different spectral characteristics.
 - 19. An optical device comprising:
- a spatially varying optical unit, the spatially varying optical unit adapted to receive light provided on a plurality of paths, the spatially varying optical unit varying a spectral characteristic of received light depending on the path of the light; and

means for providing light to the spatially varying optical unit on any one of the plurality of paths.

- 20. The optical device of claim 19 wherein the spatially varying optical unit changes the phase of the light varying amounts based on the wavelengths present in the light.
 - 21. The optical device of claim 20 wherein the spatially varying optical unit is an interferometer with a spatially varying cavity length.

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- 22. The optical device of claim 20 wherein the spatially varying optical unit changes the dispersion of the light.
- 23. The optical device of claim 19 wherein the spatially varying optical unit filters the light based on wavelength.

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- 24. The optical device of claim 23 wherein the spatially varying optical unit is a Fabry-Perot filter with a spatially varying cavity length.
- 25. The optical device of claim 23 wherein the spatially varying optical unit is a reflector, the reflectivity of the reflector spatially varying.
- 26. The optical device of claim 25 wherein the reflector has varying reflectivities for varying polarities spatially across the reflector.
- 27. The optical device of claim 19 wherein the spatially varying optical unit is an array of waveguides each having different characteristics.
 - 28. The optical device of claim 27 wherein each of the waveguides has gratings, the gratings having different spacings for different waveguides.

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29. An optical device comprising:

means for reflecting light on a first path to any one of a plurality of second paths; and

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means for receiving light on at least two of the second paths and changing a spectral characteristic of the light depending on the path of the light.

30. A method of changing a spectral characteristic of light comprising:

receiving light on a first path;

transferring the light on the first path to a selected path of any one of a plurality of second paths;

changing a spectral characteristic of the light depending on the selected path.

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